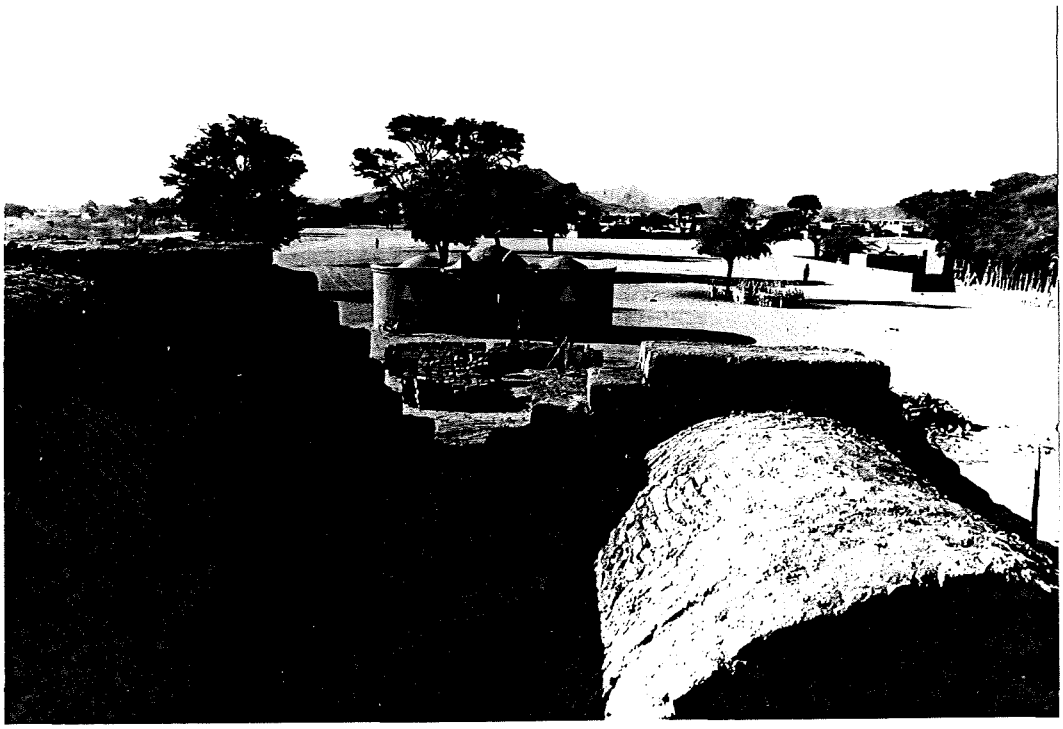
PROJECT PROPOSAL - June 1992

MOBILE TRAINING TEAM: TRAINING AND INFORMATION UNIT

WOODLESS CONSTRUCTION IN THE SAHEL



Prepared by

Development Workshop

on behalf of

IUCN - The World Conservation Union

Initial 2 year programme

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Summary

"Woodless construction" refers to a building system which includes using vaults and domes built with (unstabilized) mud bricks for roofing. This system has proved capable of meeting a wide range of housing and public infrastructure needs in arid or semi-arid regions. It was introduced to Niger in 1980, in response to the increasing difficulty being experienced by local people in obtaining the organic materials traditionally used in construction (e.g. the massive use of tree trunks and main branches in flat roofs). Since then it has shown itself to be extremely well-suited to most regions of the Sahel for the following main reasons:

* it uses a local material with which the people are already very familiar - unstabilized mud bricks - and does not require the importation of any equipment or building material, such as cement;
* it is labour-intensive, using both unskilled workers, and semi-skilled and skilled craftsmen and builders;
* it is (relatively) easy to teach and to learn to an acceptable standard in a reasonably short time;
* it is within economic reach of the poorest sections of the population, but can also be used for more sophisticated building needs;
* it provides a clean living environment and good climatic comfort, an important consideration where the diurnal temperature range is often extremely wide;
* domes in particular, but also to a lesser extent vaults, (built in a different way), are a familiar sight throughout the Sahel.

After some 12 years of various inter-related activities (building, training, technical research, awareness-raising at all levels etc.) we are confident that woodless construction has been assimilated into local indigenous building practices in those areas of Niger and of Mali which have benefited most from these activities. In the face of growing popular demand, there is now an urgent need to facilitate more training and awareness-raising. This document therefore proposes to meet this demand through the setting up of a Training and Information Unit, in the form of one (or in due course more) mobile team(s) which can move around different areas of the region in order to:

* run training courses in situ;
* provide post-training follow-up and assistance;
* evaluate and promote quality control;
* conduct various awareness-raising activities at all levels.

The mobile team will be supported by a small administrative base in Niamey, but it will be gradually become active throughout the Sahel. The Unit's activities, which will be non-profit-making, are programmed in this document for an initial 2-year setting up and consolidation period, for which the total budget is 1,204,692 Swiss francs. Given the nature of existing demand, the activities programmed for these first two years mainly concern Niger and Mali. This in no way, however, excludes the potential

to undertake activities in other countries, which is in fact one of the longer term aims of the Unit.

There is a genuine, spontaneous demand for woodless construction. As a building system it has enormous potential for helping to resolve a shelter problem, including for the very poor; as an ecologically non-agressive system, it contributes to the conservation and management of the fragile environment of the Sahel. Now is the time to seize an opportunity to build on what has already been achieved.

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Preface

The information contained in this document draws heavily on data obtained in the course of missions to Niger carried out between 1990 and 1992 by members of Development Workshop. Amongst others, the aim of these missions was to identify actions needed to stimulate the dissemination of woodless construction in the Sahel and in particular to conduct a feasibility study into the creation of a Training and Information Unit. These missions were commissioned and funded by IUCN - The World Conservation Union.

In addition, Development Workshop and IUCN collaborated in the organisation of a one-week Workshop on woodless construction which was held in Agadez, Niger, in December 1991. This was attended by representatives of various national and regional government services of Niger and Mali and of the main development agencies working in Niger. At the close of the Workshop, participants unanimously recommended the continued promotion of woodless construction and the creation of a Training and Information Unit to facilitate this.

The proposals contained in this document are therefore based on numerous contacts and discussions at all levels, over a long period, which Development Workshop has had with state services in Niger and Mali, IUCN staff in Niger, Mali and Switzerland, and many other agencies.

Section 1: Context and objectives

1.1 Introduction and context

This document is concerned with the setting up of a Training and Information Unit in the form of a mobile team, with the long-term aim of promoting and disseminating woodless construction throughout the Sahel.

"Woodless construction" is the term by which certain construction techniques which use mud bricks (unstabilized) and vaults and/or domes for roofing have become known in certain parts of the Sahel. The roofing system, which does not require the use of shuttering during construction, draws on techniques for building vaults and domes which originated in the ancient Nubian kingdom of the dry regions of the Nile valley in present-day Egypt; they are hence often known as "Nubian" vaults and domes. They were first introduced to Niger in 1980 in Chikal, south of Filingué. Since then, a survey carried out in 1990 showed that several hundred buildings had been built by various organizations and private clients, 46% of them (as at 1990) "spontaneously". i.e. without external financial support.[1]

At present, woodless construction exists in an area which embraces the majority of the inhabited regions of Niger and certain parts of Mali, (i.e. Ménaka, Gao and Youvarou). There are also a small number of built examples in Burkina Faso. This region of the Sahel is characterized by low rainfall towards the north and medium levels of rainfall towards the south. It has been severely affected by the years of drought, which have resulted in the increasing scarcity of certain species of plant and trees which are commonly used by most of the population in the construction of their homes.

Drought, however, is not the only consideration. All the countries of this region are facing a significant growth in the populations of small towns and villages, partly due to the sedentarisation of formally nomadic people, now unable to continue due to the effects of drought, but also partly as a result of high overall population growth figures. The latter are estimated in Niger, for example, at 3.1% annually, or a rate at which the population is set to double in less than 25 years. This increased sedentarisation and underlying population growth result in a growing - and increasingly concentrated - demand for building materials, including organic materials. Common building methods depend heavily on the use of wood (trunks and main branches), as well as smaller twigs and grasses (used in bundles or in woven mats). The consumption of the

1 See "Vulgarisation de la construction de voûtes et coupoles au Sahel - l'Identification des besoins", (report prepared in July 1990 by J. Norton and P. Tunley of Development Workshop on behalf of IUCN), Annex 3, for a full list of all the buildings visited.

species providing these has been shown to be now frequently outstripping the rate at which they can regenerate. In some areas, certain favoured species, such as the doum palm (Hyphaene thebaica) or the local acacia (Acacia nilotica), have virtually disappeared in a matter of two decades.[2] This has a globally negative impact on the environment and at the same time makes it extremely difficult for families to obtain adequate quality wood and branches for them to construct a decent and reasonably durable home. They are forced to resort either to illegal methods for obtaining wood of adequate quality, (cutting or cropping certain species is punishable by severe fines or imprisonment in Niger), or to using poor quality wood and branches which will need replacing in a much shorter time span, which in turn accelerates consumption still further. Both these alternatives represent a considerable and increasing financial burden. The vicious circle can only continue to accelerate if there is no major, sustained effort to give people access to viable alternative methods of building.

It is in this context, therefore, that woodless construction represents a tried and tested alternative method of building in many parts of the affected region. It has been shown to be a viable solution for the construction of homes, offices and small public buildings using locally available resources and techniques and architectural forms which are suited to the context. It must be stressed that after some 12 years of field activities in various areas of Niger and Mali, woodless construction using unstabilized mud brick vaults and domes, is no longer in an experimentation or pilot application stage. There are now very numerous built examples demonstrating that this type of building is durable and, correctly built, withstands the violent rain-storms of the wet season. Building costs have equally been shown to be comparable to, or lower than, other contemporary traditional or so-called "modern" building methods.[3]

At the same time, if wider use of these building techniques is to be encouraged, a sustained effort of dissemination is now needed. This dissemination needs to focus on two interdependent aspects: on the one hand raising awareness among a wider population, including national and regional authorities, of the potential of woodless construction for meeting modern needs; and on the other hand training sufficient builders to meet both existing and future popular demand.

2 See "Evaluation des bâtiments et des techniques de construction dans le Cercle de Youvarou, Région de Mopti," mission report by Development on behalf of IUCN, July 1991, for detailed mapping of the availability of these two species in the Youvarou region over the period 1970 to 1990.

3 See "Etude économique: bâtiments en adobe, Niger", by Peter Tunley, Development Workshop, on behalf of IUCN, 1991, for a comparative analysis of the labour and material costs of 11 buildings of differing size and sophistication and using either traditional organic materials or woodless construction, based on real examples built in Iférouane, Niger, in the late 1980's.

1.2. Background

Until fairly recently (1990), the introduction of woodless construction (vault and dome) building techniques has been achieved in the context of various programmes linked to rural development, to the conservation and management of natural resources, or to job creation and the improvement of local capacity to achieve decent housing.

In the course of the 12 years which have now elapsed since the first "demonstration" building was built in Niger[4], at least ten local and international bodies have played a part in disseminating these building techniques in Niger and Mali. Of these, three have played a particularly important role:

ISAID, through their "Tapis Vert" project, based in Chikal, southern Niger;
World Vision, based in Ménaka, Mali;
IUCN (The World Conservation Union) with WWF (The World Wide Fund for Nature).

IUCN/WWF in particular devoted over many years a major effort to woodless construction through their Project for the Conservation and Management of Natural Resources in the Aïr and Ténéré (PAT), based in Iférouane, northern Niger and financed by DANIDA (Danish bilateral aid) and DDA (Swiss bilateral aid). IUCN has also promoted woodless construction through its Project for the Conservation of the Environment in the Youvarou region, Mali. Development Workshop has provided technical assistance inputs to both ISAID (running the first training course on their behalf in 1980) and to IUCN/WWF (various research, documentation and practical activities from 1985 to 1992), as well as to other NGOs who have recently taken up the techniques.

Until 1990, most training was carried out "on-the-job" with trainee builders simultaneously working on the construction of buildings commissioned either by project organisations for their infrastructure requirements, (including offices, guest houses, staff housing) or by national or regional authorities for public buildings (the *gendarmerie* at Iférouane, the meteorological station in Chikal, etc.) Such buildings have played an important part in demonstrating the potential of woodless construction. Since 1983, there has also been a significant number of "spontaneous" construction, i.e. buildings put up by trained builders on behalf of "normal" clients - private or public - with no additional technical or financial support. By the end of 1990, there were more than 140 such "spontaneous" buildings, or 46% of the total.

"On-the-job" training has not, however, been without its problems. Although experience gained on actual buildings is essential, trainee builders were not always exposed to the whole building process. Very occasionally this led to structural problems on buildings undertaken subsequently where no technical guidance was

4 Literacy centre, Chikal, built as part of a training course for builders, run by Development Workshop, funded by ISAID, in 1980.

available. Aware of this deficiency, IUCN/WWF's Aïr and Ténéré project resolved in 1988 to organize formal training programmes for builders. Here, trainees had the additional benefit of theoretical teaching sessions, to explain the principles behind the practices, and then went on to work in pairs on practical exercises (bonding patterns using miniature bricks, building small walls and vaults at ground level, etc.), before going on to build a complete building working in small teams, each responsible for the whole building process, from foundations to finishings. Trainers noted a marked improvement in the trainees' grasp of the overall techniques, better quality work on site, and more confidence in their ability to use the techniques. Formal training programmes clearly have a major role to play in making efficient use of training resources. A course run by Development Workshop for builders from Niger and Mali in 1991 confirmed this, with trainees going on rapidly to build efficiently and with confidence.

It is important to bear in mind, however, that there are two sides to the woodless construction initiative. As the experience of IUCN/WWF in their Aïr and Ténéré project, as well as that of IUCN in Youvarou, has shown:

* on the one hand, the natural environment and the built environment are inextricably linked: the problems and issues of one cannot be considered without those of the other;
* on the other hand, it is possible to reconcile the needs of the environment with human shelter needs, even when these are apparently in conflict, by making a viable alternative building system genuinely available.

In this respect, woodless construction, which addresses both the day-to-day problems of people trying to achieve a decent shelter and the longer-term issue of the management of a threatened environment, can be considered to be a success insofar as:

* where the techniques are well-known, demand for wood, branches and grasses is reduced, and species are able to regenerate at a normal rate;
* at the same time, people have access - technical and financial - to a building system capable of providing a range of sizes and styles of building and therefore of meeting the majority of their building needs, using a local building material (earth) and local (trained) labour.

The social acceptability of these techniques is facilitated by the existence of a range of "demonstration" buildings, differing widely in size and function, from:

* a small, round, domed "case", with thin walls, costing very little and intended as a substitute for the traditional grass hut (typically built by women and remaining their property), to...
* larger, more elaborate buildings, including offices, villas and various infrastructure buildings, the design of which often uses highly effective combinations of multiple vaults and domes.

Apart from the builders' training and construction activity outlined above, a range of publications on woodless construction aimed at a wider audience and various target groups has been produced as part of the overall promotion and dissemination effort

so far. (See Annex 2 for a full list of these.) These include a construction manual aimed at trained builders or other interested professionals,[5], guide-lines for producing simplified plans capable of being used by trained, but perhaps semi-literate, builders,[6] and others,[7] Thanks to such publications and above all the presence of built examples, demand for woodless construction is now growing in the public as well as the private sector.

To meet this demand, and in the light of the genuine potential of woodless construction techniques, Development Workshop and IUCN propose the setting up of a Training and Information Unit, in the form of a mobile team based in Niamey.

1.3. Target groups

The Unit's activities will be aimed principally at the inhabitants of villages and secondary towns located in areas of low and medium rainfall in the Sahel region where the soil in the immediate area is suitable for building purposes.

One of the aims of the Unit is to improve the capacity of builders and those traditionally responsible for building in the villages - including women - to build using vaults and domes for roofing. In the absence of a national or regional capacity for designing such buildings, the Unit also aims to train a limited number of architects and building technicians.

1.4. Global objectives of the Training and Information Unit

The development objectives of the Unit are as follows:

* to contribute to a better conservation, management and use of natural resources;
* to facilitate the provision of decent and durable homes which are technically and financially accessible to the majority of the population;
* to improve national capacities to meet housing and building needs and to improve the built environment without recourse to scarce or imported resources.

5 "Guide Pratique - Les toitures sans bois", by Development Workshop, funded by IUCN, 1990, showing the step-by step construction of 3 simple building types.

6 "Fiches de communication aux maçons" by Development Workshop, a training and practical reference document.

7 "Etude technique: bâtiments en voûtes et coupoles en adobe", by Alexandre Douline, Development Workshop.

Section 2: Unit activities

2.1. Detailed objectives

In the light of the global objectives outlined above, the Unit's detailed objectives are as follows:

* to train builders in woodless construction techniques;
* to train technicians in the principles of design and site supervision for woodless construction;
* to raise awareness amongst the general public at all levels about the existence of woodless construction, its potential to meet building needs and its relevance to environmental issues;
* to provide technical advice or assistance with regard to woodless construction on request or in the course of regular follow-up of trained builders;
* to promote the creation of a structure to encourage and maintain a high standard of work and a quality image for woodless construction;
* to develop a local capacity for all of the above.

2.2. General presentation of activities

To achieve these objectives, the Unit will focus on four main poles of activity:

* training;
* awareness-raising;
* technical support;
* the promotion of a quality control system.

2.2.1. The Unit's training function

The Unit's main activity will consist in training, at four levels:

1. builders, in woodless construction building techniques, and where appropriate simple design principles and applications;

2. site supervisors, in quality control of materials (bricks and blocks) and site organisation and quality control;

3. architects/technicians, in design and simplified technical drawing of vaults and domes;

4. trainers, in teaching 1 to 3 above, with a view to ensuring a regional capacity in the longer-term.

Training programmes will be held:

* either in situ where there is sufficient demand to justify the mobile team running a course in a given locality and where the locality can fulfil certain conditions. These include logistical considerations (location for formal training sessions,etc.), but equally important "soft" factors, such as a previous experience of or encounter with vaults and domes, a genuine commitment on the part of the local (e.g. village) authorities and high personal motivation on the part of the builders themselves;

* or in centralized locations selected in collaboration with existing institutions (e.g. technical colleges) and for maximum accessibility.

The courses will be open to a number of different candidates:

* individual or groups of (male) builders wishing to learn woodless construction techniques;

* organizations and institutions with an interest in woodless construction, including state national and regional departments within the various ministries concerned, private commercial enterprises, non-governmental and international organizations;

* subject to demand, groups of women.
The latter category deserves further comment. It is often the women of the village who are responsible for building light shelters using organic materials, (branches, bundles of grasses, woven grass mats etc.), which are collected and prepared often over a long time span. (This is partly a practical necessity, since the men are frequently obliged to leave the village, sometimes for long periods, to seek work. The "cases" also have a socio-cultural role, however, as they remain the property of the woman.)
Women are therefore particularly vulnerable to the problems of obtaining sufficient quantities of organic materials for building. Past woodless construction activities have therefore included the development of small round structures with a domed roof, built using thinner (20 cm) walls. These are capable of being built by women, reminiscent in shape of the "cases", and have been shown to "cost" about the same (in labour-time, food for helpers and materials). Where examples exist, they are readily used and women in those villages have asked for training to be able to build more. Special training courses are needed firstly to adapt the con-

tent to these particular structures and secondly in order to be organized in such a way as to be compatible with women's daily routine.

Trainees fees will be paid as follows:

* for trainees who have no sponsor (e.g. a village builder requesting training on his own initiative - a case which has arisen on several occasions), or in the case of courses organized by the Unit for a particular target group (e.g. women), fees will be covered by Unit funds, in the form of training grants;

* for trainees sponsored by an organization (e.g. a development project, a state organization, or a private company). the organization will pay a fee per trainee, based on actual variable costs (i.e. without contribution to the fixed costs of the Unit, and without profit).

2.2.2. The Unit's awareness-raising function

The Unit will also undertake to raise awareness of woodless construction amongst a wider public. This will consist of making the achievements and the potential of these building techniques known, primarily at two levels:

* at local (village) level, where local conditions are favourable to woodless construction, through visits to inform the population and by carrying out demonstrations;

* at national and regional level, through information campaigns aimed at the general public and through specific activities, such as professional seminars[8] or theatre shows.

All appropriate media will be used, ranging from posters, leaflets and T-shirts to video-cassettes,[9] slide packages and detailed technical documentation.

In order to avoid generating demand which cannot be met, awareness-raising activities - particularly at local (village) level - will be coordinated with training activities. In this way, as demand increases, so will the number of builders and technicians capable of meeting the demand in each locality or region.

8 A highly successful, week-long seminar was held in Agadez in December 1991 to inform national and regional government representatives and aid agencies of the progress so far and future potential of woodless construction.

9 A general interest 20 min. video-cassette, La Construction sans Bois, was produced by Development Workshop and IUCN in 1992.

2.2.3 The Unit's post-training technical assistance function

The Unit will provide a post-training service for any individual or organization which has benefited from training. This service will take two forms:

* site visits to carry out informal quality control assessments and advise newly-trained builders: the aim here is to provide not only technical support, but also encouragement and confidence-building;

* follow-up visits on demand in response to builders' or technicians' requests for help to resolve particular problems or for advice in special circumstances.

2.2.4. The Unit's quality control function

A very important aspect of the Unit's activities will be to promote work of recognized quality.

To this end, the Unit will encourage and where possible facilitate the creation of an independent Association of woodless construction builders. A builder wishing to join the Association in order to benefit from its "stamp of quality" will only be admitted if his work is of consistently high quality and carried out in a professional manner. He could subsequently be excluded from the Association for poor work or bad professional practices. It will therefore be in the interests of members of the Association to exercise mutual quality control. On the one hand the existence of the Association will in itself promote high quality work, and on the other member builders will receive the following benefits from membership:

* a high quality professional image;

* easier contact between clients and trained builders (the Association would be able to provide a client with the names of trained builders working to a high standard in his area);

* greater credibility for builders working in areas where woodless construction is relatively little known;

* information exchange.

Section 3. Institutional and operational structure

3.1. Institutional structure

In carrying out the functions outlined above, the Unit will be collaborating with a number of other organizations and institutions working in various countries of the Sahel. Its administrative framework must therefore enable it to be at the service of as many individuals and organizations (private or public), as well as state institutions, as possible. This demands an institutional structure capable of responding with maximum flexibility in its day-to-day activities.

It is proposed that a Steering Committee should be created to provide a forum for representatives of all the main partners responsible for the setting up of the Unit (IUCN, Development Workshop, other NGOs and bilateral aid organizations). The Steering Committee will invite observers from amongst those individuals and organizations with which the Unit in particularly involved. (These could of course include representatives of state departments within the ministries concerned.) The principle role of the Steering Committee will be to supervise and decide on the overall programming of activities of the Unit, and will provide back-up support for these activities, particularly through liaison with administrative and technical bodies. The Steering Committee will meet at least twice a year, initially in Niamey.

The programme for setting up and operating the Unit will be carried out based on a partnership between IUCN and Development Workshop. Development Workshop will sign a contract with IUCN, thanks to which Development Workshop will assume responsibility for the administrative and financial implementation of the programme. In practice, this responsibility will reside with the Programme Coordinator, who will be a permanent member of Development Workshop. The programme will be an integral part of the overall IUCN programme of work in Niger, and as such its execution in Niger will be under the authority of the IUCN Representative.

3.2. Financial structure

Funds relative to the provision of technical assistance, and the related travel costs (Budget lines 4113, 4201, 4203 and 4205) will be transferred to Development Workshop at the request of the Programme Coordinator. Remaining funds will be managed by the IUCN Representation in Niger according to the procedures in place at the Representation. Disbursement of these funds will be made at the request of the Programme Coordinator. The Programme Coordinator will make regular reports

on the advancement and operation of the programme. The IUCN Representation will provide three monthly financial reports.

3.3. The mobile team

The operational activities of the Unit will be carried out by a mobile team, made of the members listed in paragraph 3.6.1. The team's activities will be supported by a minimal administrative staff based in Niamey.

3.4. Duration

The duration of the programmed activities of the Unit will depend, by their very nature, on the evolution of demand, some of which will be generated in turn by the awareness-raising activities of the Unit itself. It is expected, however, that the Unit's principal mission - training and information - will be accomplished after 5 years' activity. After that time, it is expected that there will be sufficient trained builders and technicians, able to pass on their skills in traditional ways, for the Unit's training activities to cease or to change in focus. The duration of the currently anticipated activities of the Unit is therefore 5 years.

An initial setting up and running-in period of 2 years is considered necessary for the Unit to achieve maximum operational efficiency. During this 2-year period, programmed activities include basic training of 120 builders, more advanced training of 20 technicians/site supervisors, training in basic design principles and drawing for 10 suitably experienced individuals, as well as associated awareness-raising activities. Detailed budgets have been prepared for this initial 2-year period, for which funds are currently being sought. Detailed budgets for years 3 to 5 of the Unit's activities will benefit from the experience of the first two years activities and will therefore be prepared only towards the end of the 2nd year of operation.

3.5. Follow-up and evaluation

The Unit's activities will be evaluated at three levels.

The Unit operational team, together with the management and administrative staff, will conduct regular in-house evaluation of the Unit's activities with a view to consolidating the objectives of the Unit and if necessary to fine-tuning the methods used to achieve them. These evaluations will also serve to help members of the Unit to focus on the need to continually assess the quality of their work and the results they obtain. To this end, trainees will be systematically invited to give their views on the training they have received and to suggest improvements at the end of their training.

The Steering Committee will conduct a bi-annual financial and operational evaluation of the previous 6 months' activities on the basis of reports forwarded by Development Workshop to IUCN and other indicators.

In addition, an external global review will be carried out once a year, each year by a different outside professional with the necessary qualifications and experience to comment constructively both on the Unit's activities and on its efficiency in carrying them out. This completely objective view may both contribute helpful suggestions and reinforce the image and credibility of the Unit to outside bodies.

Evaluations will be complemented by publications and other media aiming to inform as wide a public as possible, including during the first 2 years of operation.

3.6. Resources required

3.6.1. Human resources

The Unit's activities are diverse in nature. It will focus, however, on two priorities. Firstly, communicating information and practical help (including technical training) on woodless construction to various target groups. Secondly, being attentive to the reactions of these target groups in order to be aware of the difficulties and problems people may have (or perceive) in using woodless construction, as well as the benefits they obtain (or perceive). It is thus of the greatest importance that all those involved in the Unit's activities should be familiar with the realities of daily life in the localities where the mobile team will be active and that they should retain an open mind in relation to the Unit's role.

The mobile team will therefore consist of technical training staff and staff specializing in communication and awareness-raising activities who also fulfil the overall requirements outlined above. There will also be a small logistical support staff.

Trainer-builders will be recruited form amongst builders who have both extensive experience of woodless construction in practice and have shown their aptitude for training other builders in the course of training programmes previously run by Development Workshop. Apart from this "pool" of experienced builders, other builders and manual labour may be employed on a short-term basis in the light of the needs of particular activities. It is of course important that trainer-builders should be able to carry on their usual building activities and retain their local clients and to this end they will be engaged alternately from within a "pool" of available trainers-builders".

The Unit will depend for its activities as a whole on assistance provided by Development Workshop, both in terms of technical support and organizational back-up. This assistance will be provided by the Programme Coordinator and other Development Workshop members through regular or ad hoc inputs in the light of the programmed activities. At the same time, the Unit staff, and notably the operational manager, the technician and the trainer-builders, will gradually assume greater responsibility for the Unit's activities through continuous training carried out throughout the programme. Given the essentially practical nature of the programme, preliminary training of the Unit staff, i.e. prior to the first course, will be short in duration.

The anticipated permanent staff of the Unit (and their main job tasks) are listed below:

Operational manager

preferably a local national, responsible in collaboration with the Programme Coordinator and other Development Workshop members for the administration and technical follow-up of the programme, the organization and coordination of awareness-raising activities and the presentation of information in theoretical sessions. The programme will ensure the necessary training.

Two trainers

trainer-builders (or similar) with extensive experience both of woodless construction in practice and of training in these techniques, responsible principally for practical training, but also for appropriate awareness-raising activities. (Several Nigerian and Malian builders meeting these requirements who have already been employed by Development Workshop on various training programmes have already been identified as potential candidates.)

Technician

technician with appropriate architectural (or engineering) qualifications or equivalent experience, responsible for design requirements, site analysis and surveys, soil testing, etc., and general assistance of a technical nature to the operational manager.

Accountant/secretary

suitably qualified accountant/secretary, preferably with experience of similar activities and international organisations, responsible for financial records and reporting, and general assistance of an administrative nature to the operational manager.

Driver/mechanic

responsible for vehicle maintenance and driving mobile team.

Driver/office hand

responsible for driving mobile team and manual assistance to other staff.

2 watchmen

responsible for guarding office premises (24 hours per day).

2 unskilled labourers

part-time helpers principally for unskilled jobs during training courses.

3.6.2. Infrastructure

Office

The Unit will rent office and ancillary space in Niamey adequate for the efficient administration of the Unit, vehicle maintenance, and equipment storage.

3.6.3. Equipment required

Vehicles

* 1 4-wheel drive car (e.g. Landrover or Mitsubishi),
* 1 4-wheel drive canvas-top pick-up with trailer (e.g. Landrover)

Given the practical nature of the programme activities, it is anticipated that most regional travel, even over long distances, will take place by car. This will allow the most economic transportation of equipment and will ensure a vehicle for use during the course or other activity. (It is for this reason that regional flights (budget line 4203) are low in number.)

Office equipment/supplies

* AT computer, with printer and power-stabilizer
* computer programmes (word-processor, data base, DTP, spread-sheet)
* photocopying machine
* facsimile machine
* typewriter
* office furnishings including ventilators/humidifier for computer room
* comb-binder
* office supplies.

Technical equipment

* laboratory equipment for soil analysis etc.
* climatic analysis equipment
* Training equipment
* screen
* slide projector
* video-cassette player and TV screen
* video camera
* 2 automatic cameras
* blackboard
* construction tools.

Site equipment

* generator
* camp beds, with accessories.

The Steering Committee will decide on the final destination of all equipment at the end of the 5-year period, taking account of the future needs of the builders using woodless construction techniques.

Vehicles at the disposal of the Unit will be used only for travel directly related to the activities of the Unit. Any other use will require the approval in writing of the Programme Coordinator.

All equipment, vehicles and supplies procured for the operation of the Unit will benefit from exemption from all duties and taxes in accordance with the "protocole de siège" signed between the Government of Niger and IUCN on 23 August 1990 and the "protocole d'accord" signed between the Government of Niger (Ministry of Planning) and the locally accredited NGO Development Workshop on 4 May 1989.

Section 4. Timetable

4.1. Timetable of activities

The programme shown on the following page is for the first year of operation of the Unit, which includes initial setting-up time.

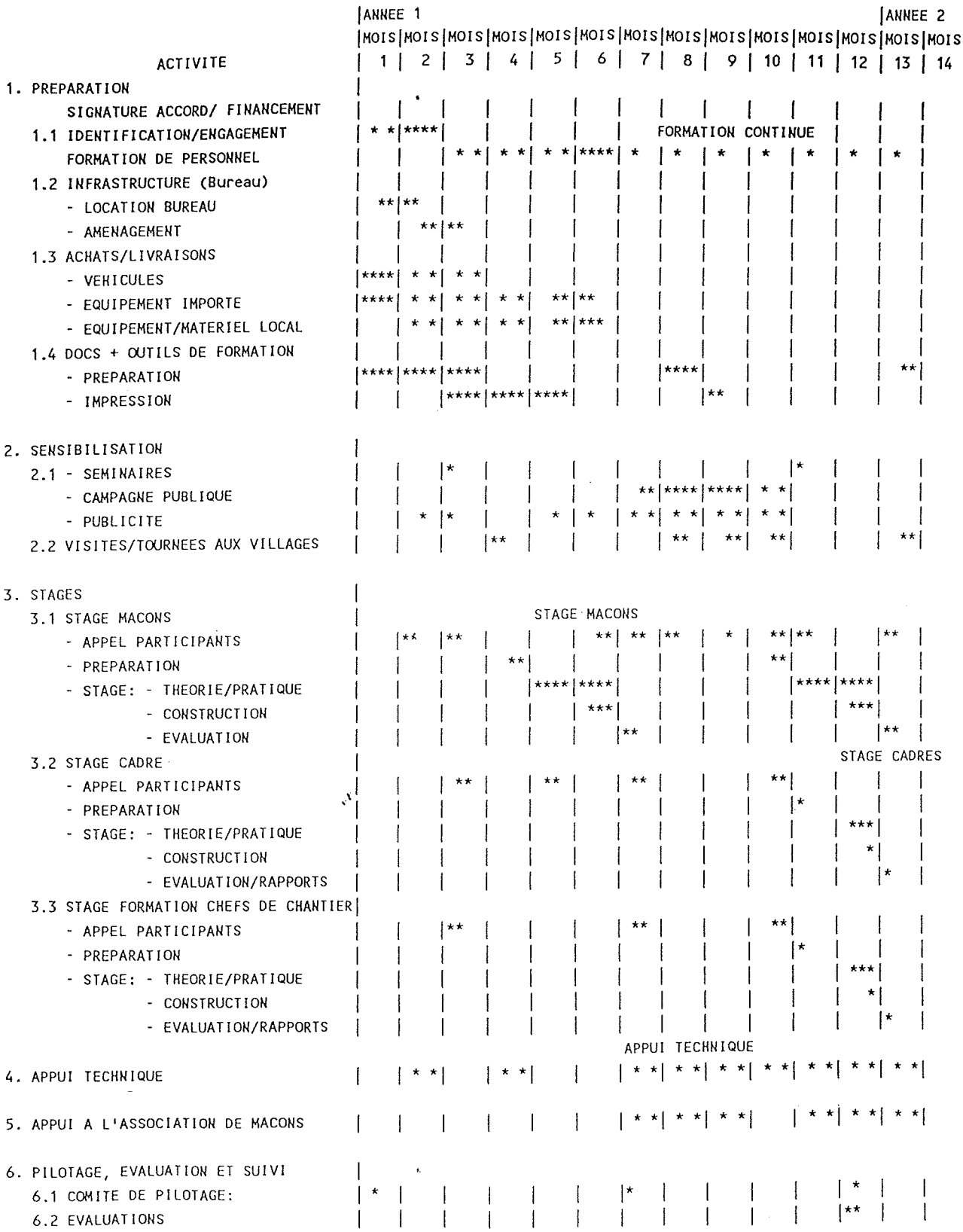
The programming of the second year follows, and includes at least 2 builders' training programmes, with a 3rd being planned at the end of that year, and one technicians' training programme. Technical support to trained builders will be regularly provided. Given their mainly practical nature, technicians' and site supervisors' training courses will be coordinated with builders' training courses, and will frequently be run in parallel.

The timetable for subsequent years of operations by the Unit will be similar to that of year 2.

4.2. Operational partners

Operational partners will be selected and invited as the occasion and the need arises. It must be stressed, however, that several future partners in Niger and Mali have already come forward, are in discussion with Development Workshop and have expressed their desire to sponsor trainees for training by the proposed Unit. These included state organizations, local authorities, national and international NGOs and development agencies active in the region.

Timetable: Year 1



Timetable: Year 2

ACTIVITE	ANNEE 2 MOIS 13	MOIS 14	MOIS 15	MOIS 16	MOIS 17	MOIS 18	MOIS 19	MOIS 20	MOIS 21	MOIS 22	MOIS 23	MOIS 24
1. PREPARATION												
SIGNATURE ACCORD/ FINANCEMENT												
1.1 IDENTIFICATION/ENGAGEMENT												
FORMATION DE PERSONNEL	*	*	*	*	*	*	*	*	*	*	*	*
1.2 INFRASTRUCTURE (Bureau)												
- LOCATION BUREAU												
- AMENAGEMENT												
1.3 ACHATS/LIVRAISONS												
- VEHICULES												
- EQUIPEMENT IMPORTE												
- EQUIPEMENT/MATERIEL LOCAL												
1.4 DOCS + OUTILS DE FORMATION												
- PREPARATION	**		**		**		**		**			**
- IMPRESSION						*		*		*	*	
2. SENSIBILISATION												
2.1 - SEMINAIRES		*					*					
- CAMPAGNE PUBLIQUE										****	****	
- PUBLICITE			*	*	*		* *	* *	* *	* *	*	*
2.2 VISITES/TOURNEES AUX VILLAGES	**	**	**		**		**		**		**	
3. STAGES												
3.1 STAGE MACONS	STAGE MACONS					STAGE MACONS				STAGE MACONS		
- APPEL PARTICIPANTS	**	**	****		**	**	**	**		**	**	****
- PREPARATION			**				**					**
- STAGE: - THEORIE/PRATIQUE			**	****	**			****	****			**
- CONSTRUCTION				*	**				***			
- EVALUATION	**				**					**		
3.2 STAGE CADRE	E CADRES								STAGE CADRES			
- APPEL PARTICIPANTS							**					
- PREPARATION								*				
- STAGE: - THEORIE/PRATIQUE									***			
- CONSTRUCTION									*			
- EVALUATION/RAPPORTS	*									*		
3.3 STAGE FORMATION CHEFS DE CHANTIER					Note: stages lies aux stages macons							
- APPEL PARTICIPANTS							**					
- PREPARATION								*				
- STAGE: - THEORIE/PRATIQUE									***			
- CONSTRUCTION									*			
- EVALUATION/RAPPORTS	*									*		
4. APPUI TECHNIQUE	* *	* *	* *	* *	* *	* *	* *	* *	* *	* *	* *	* *
5. APPUI A L'ASSOCIATION DE MACONS	* *	* *	* *	* *	* *	* *	* *	* *	* *	* *	* *	* *
6. PILOTAGE, EVALUATION ET SUIVI												
6.1 COMITE DE PILOTAGE:						*						*
6.2 EVALUATIONS									**			*

Section 5. Budget: phase 1 (years 1 and 2)

POSTE	DESIGNATION	UNITE	P/U FRANCS SUISSES	ANNEE 1 NO DE U PAR AN	MONTANT	ANNEE 2 NO DE U PAR AN	MONTANT ANNEE
	A1.PERSONNEL ETRANGER						
4113	COORDINATION TECHNIQUE	MOIS	10,680	1.5	16,020	1.5	16,981
4113	CONSEILLER TECHNIQUE (NIGER)	MOIS	10,680	7	74,760	5	56,604
4113	CONSULTANT PRINCIPAL	MOIS	10,680	3	32,040	2	22,642
4113	CONSULTANT PRINCIPAL	MOIS	10,680	1	10,680	2	22,642
4113	CONSULTANT LOCAL	MOIS	3,000	4	12,000	1	3,180
	SOUS TOTAL				145,500		122,048
	A2.VOYAGES INTERNATIONAUX						
4201	VOYAGES INTERNATIONAUX	VOYAGE	3,500	9	31,500	7	25,970
4203	VOYAGES REGIONAUX	VOYAGE	1,000	2	2,000	2	2,120
4205	PER DIEMS	JOUR	44	420	18,270	330	15,216
	SOUS TOTAL				51,770		43,306
	TOTAL A.				197,270		165,355
	BUDGET FONCTIONNEMENT LOCAL						
	B1.EQUIPEMENTS ET INSTALLATIONS						
4221	ACHAT VEHICULE 4*4 (BACHE)	VEHIC	42,000	1	42,000		0
4221	ACHAT VEHICULE 4*4 (PERSONNEL)	VEHIC	42,000	1	42,000		0
4222	LOYER BUREAU	MOIS	500	12	6,000	12	6,360
4223	EQUIPEMENT ELECTRONIQUE	GLOBAL	10,000	1	10,000		0
4224	EQUIPEMENT DE BUREAU	GLOBAL	5,000	1	5,000		0
4225	EQUIPEMENT SCIENTIFIQUE	GLOBAL	2,500	1	2,500		0
4226	EQUIPEMENT PEDAGOGIQUE	GLOBAL	500	1	500	1	530
4228	EQUIPEMENT DE TERRAIN	GLOBAL	500	1	500	0	0
	SOUS TOTAL				108,500		6,890
	B2.FONCTIONNEMENT						
4239	ENTRETIEN EQUIPEMENT	MOIS	125	12	1,500	12	1,590
4241	ENTRETIEN BATIMENTS	GLOBAL	500	1	500	1.5	795
4243	ASSURANCE VEHICULES	VEHIC	400	2	800	2	848
4244	EAU ET ELECTRICITE (BUREAU)	MOIS	225	12	2,700	12	2,862
4247	ENTRETIEN VEHICULES	KM	0	70000	10,500	70000	11,130
4248	CARBURANTS, LUBRIFIANTS	KM	0	70000	14,000	70000	14,840
4250	PROGAMMES ORDINATEUR	GLOBAL	3,250	1	3,250		0
4261	FOURNITURES DE BUREAU	GLOBAL	1,500	1	1,500	1	1,590
4263	AFFRANCHISSEMENT	GLOBAL	750	1	750	1	795
4264	COMMUNICATIONS	GLOBAL	400	12	4,800	12	5,088
4301	FRAIS DE BANQUE	GLOBAL	500	1	500	1	530
4322	RECEPTION, ACCUEIL	GLOBAL	250	1	250	1	265
	SOUS TOTAL				41,050		40,333
	B3.DOCUMENTATION ET MEDIA						
4325	MATERIEL AUDIO VISUEL	GLOBAL	10,500	1	10,500		0
4327	DOCUMENTATION / ABONNEMENT	GLOBAL	1,500	1	1,500	0.5	795
4341	IMPRIMERIE, doc/sensibilisation	GLOBAL	5,000	1	5,000	0.5	2,650
4342	TRADUCTION (LANGUES LOCALES)	GLOBAL	1,000	1	1,000	0.5	530
4343	RAPPORTS/ ARTICLES	GLOBAL	500	1	500	1	530
4347	PHOTOS	GLOBAL	1,500	1	1,500	1	1,590
	SOUS TOTAL				20,000		6,095
	B4.PERSONNEL LOCAL						
4615	RESPONSABLE /ANIMATION (1)	MOIS	2,000	12	24,000	12	25,440
4615	FORMATEURS/ANIMATEURS (2)	MOIS	600	24	14,400	24	15,264
4615	TECHNICIEN (1)	MOIS	600	12	7,200	12	7,632
4615	SECRETAIRE/COMPTABLE (1)	MOIS	500	12	6,000	12	6,360
4615	CHAUFFEUR/MECANICIEN (1)	MOIS	300	12	3,600	12	3,816
4615	PLANTON/CHAUFFEUR (1)	MOIS	250	12	3,000	12	3,180
4615	GARDIEN (2)	MOIS	135	24	3,240	24	3,434
4615	CNSS	MOIS	475	12	5,700	12	6,042
	SOUS TOTAL				67,140		71,168
	TOTAL B.				359,086		275,964
	B5.PROGRAMMES						
4626	STAGES DE FORMATION MACONS	GLOBAL	55,330	2	110,660	2.5	146,625
4627	STAGES DE FORMATION CADRES	GLOBAL	816	1	816	0.5	432
4628	SENSIBILISATION REGIONALE	GLOBAL	7,500	1	7,500	0.1	795
4629	SENSIBILISATION VILLAGEOISE	GLOBAL	2,420	1	2,420	1	2,565
4630	APPUI TECHNIQUE MOBILE	GLOBAL	1,000	1	1,000	1	1,060
	SOUS TOTAL				122,396		151,477
	TOTAL B.				359,086		275,964
	TOTAL A + B				556,356		441,318
	5% IMPREVUS				27,818		22,066
	15% GESTION				87,626		69,508
	TOTAL POUR CHAQUE ANNEE				671,800 ANNEE 1		532,892 ANNEE2
	TOTAL DEUX ANS, SOIT LA PERIODE D'UNE PREMIERE PHASE				TOTAL POUR DEUX ANS FRANCS SUISSES		1,204,692

Annex 1. Programmed activities

The activity outlines given on the following pages are included in order to give an idea of the contents of different actions and training programmes. In practice the detailed programme for each event will be adjusted to suit the local context and the experience of the participants, and will also take into account feedback from preceeding programmes and evaluations.

Activity 1: Builders' training

Objective

To train builders using local materials in techniques of woodless construction i.e. using vaults and domes built from unstabilized mud bricks without shuttering.

Participants

The average number of trainees per course will be 30, and might include builders already experienced in other building methods, or younger apprentice-builders.

The average length of a course will be 2 months (to be determined in part dependent on the number and experience of the trainees). In addition the training team will need to allow approximately two weeks for preparation and two weeks at the close of the course for evaluation of the results and the teaching methods used and if necessary for modification of the training aids used.

Content

Training will cover the following:

* site selection;
* soil selection, production of blocks and bricks, with simple performance tests;
* organisation of simple building sites;
* laying out of simple buildings (2 to 4 rooms) in different configurations;
* practical construction of each part of the building - foundations, walls, openings, vaults and domes, etc.;
* choice and manufacture of finishings (door and window-frames etc.);
* an introduction to the basic principles of the design of simple buildings;
* estimation of material and labour quantities (and costs) using guide-line tables;
* latrine construction.

Wherever possible, the course will include organized tours of other built examples and activity cycles including:

* presentation of the main techniques of woodless construction;
* practical demonstration of the construction of each element by experienced builders (vaults, domes on round and on rectangular walls, etc.);
* practical exercises by the trainees (e.g. repetitive building and knocking down of practice structures); small-scale practice construction of elements of the building - foundations, low walls and vaults at ground level, etc.;
* reference and revision thanks to the use of the illustrated manual, Le Guide Pratique.

Each course will include the start-to-finish construction of a few small buildings, either requested by the local (e.g. village) authorities, or commissioned by local "clients". (These provide excellent practice and confidence-building for the trainees and ensure that demonstration examples are left in the public eye after training is completed.) In both cases, the Unit donates labour and the technical assistance, all other costs (site, materials, finishings, etc.) being borne by the organizational or individual "client".

Activity 2. Training for design principles and drawing

Objective

To develop amongst technically qualified regional staff the capacity to design (and draw) small and medium-sized building using woodless construction techniques.

Participants

These courses will be available to appropriately qualified staff (architects, building engineers, technicians) or individuals who may have no formal qualification but whose experience would allows them to benefit fully from such training. The average number trained on each course will be 10. The duration of each course will be minimum 3 weeks, depending on the nature and level of qualification of the trainees.

Content

Each course will cover four main areas:

* visits to built examples and analysis of their characteristics;
* theoretical sessions; design and planning guide-lines;
* practical exercises (building) and participation in site work;
* design of an actual building(s) project.

The importance of "hands-on" experience will be stressed. Each participant will be expected to build a vault and help to build a dome him(her) self.

Theoretical sessions and practical exercises will cover the technical aspects of woodless construction:

* the structure and limiting constraints of vaults and domes;
* bonding patterns and wall layout of walls suitable for woodless construction;
* sizing and placing of openings;
* soil analysis, performance testing methods for mud bricks and blocks;
* criteria for choice of site and layout of a building (orientation, rainwater runoff etc.)

There will also be sessions on:

* passive climatic design;
* lay-out for a complex of buildings;
* design and implementation of latrines and sanitary systems.

Activity 3. Training for site supervisors

Objective

To train experienced builders or other suitable candidates in the organisation and management of small and medium-sized building sites, with particular reference to woodless construction.

Participants

This course will be open to builders or building technicians with a good grasp of woodless construction techniques and who have shown their aptitude for taking additional responsibility on site.

Content

The course content will include the following:

* techniques for site selection, including identifying unsuitable ("black cotton") soil;
* organization and management of the production of unstabilized (adobe or sun-dried) mud bricks conforming to various sizes and to a high standard; organisation of transport (method to be selected depending on the context and after comparison of various options - lorry, cart etc.)
* quantitative estimates for complex buildings;
* organisation of large sites and quality control;
* analysis of common problems in the construction of vaults and domes and identification of measures to be taken to rectify these.

Each course will last approximately 3 weeks.

Activity 4. Awareness-raising at local (village) level

Objectives

To raise awareness amongst local populations concerning the problems linked to over-exploitation of organic materials and the potential of woodless construction in this respect.

Content

The mobile team will undertake "tours" of villages located in areas where the physical and climatic conditions (nature of the soil and increasing scarcity of wood and branches for construction purposes) are favourable to the promotion of woodless construction.

These tours will generally take the form of three stages in each village:

1. a preliminary visit - presentation of the overall programme to local representatives; possible identification of a site for the construction of a small demonstration building; collection of soil samples for analysis;

2. technical follow-up - following testing of samples, and subject to confirmation of the suitability and availability of a site, organisation of the construction of blocks and bricks in preparation for the construction of the demonstration building;

3. local awareness-raising campaign - presentations using various media on woodless construction and its potential; the construction, using village help, of a small, simple building; "official" opening and exhibition of posters etc.

This might be followed up by opening discussions on the training of suitably motivated builders from the area.

Annex 2. Available Documentation

The following documents have already been produced in the context of woodless construction building and training activities in Niger and Mali:

"*Information sheets - Woodless Construction*", Development Workshop, 1992.

"*Fiches techniques - Construction sans bois*", Development Workshop, 1991.

"*Vulgarisation de la construction de voûtes et coupoles au Sahel: Phase 1: Identification de besoins*", rapport réalisé en juillet 1990 par J. Norton et P. Tunley, Devlopment Workshop, commandité par l'UICN.

"*Etude Economique. Bâtiments en Adobe, Niger. Comparaison de coûts: constructions traditionnelles et avec voûtes et coupoles*", étude réalisé par P. Tunley, Development Workshop en février 1991, commandité par l'UICN.

"*Etude Technique. Bâtiments en voûtes et coupoles en adobe, Niger*", étude réalisé par A. Douline, Development Workshop en septembre 1990, vols 1-4. commandité par l'UICN.

"*Guide Pratique: Les toitures sans bois*", manuel illustré réalisé par Development Workshop et PCGRNAT, commandité par UICN, juin 1990.

"*Une méthode de communications aux maçons -Fiches techniques et dessins*", Development Workshop, 1991.

"*Iférouane - habitat en évolution*", Diana Hammer et Peter Tunley/Development Workshop, 1991.

"*Programme Habitat Humain: Evaluation des bâtiments et des techniques de construction , Cercle de Youvarou, région de Mopti, Mali*", Development Workshop, 1991.

"*Atélier Construction Sans Bois - Rapport de synthèse*", UICN/Development Workshop, 1991.

There is also a video film in French -

"*La Construction sans bois*", par Annick Turner pour UICN//Development Workshop, 18 mins, 1992.

and a comprehensive set of slides:

environmental problems; history of the woodless construction programmeue; technical issues; etc. Development Workshop, 1991/92.